APPLIED RESEARCH—Keeping Idaho’s $512M wheat crops viable amid heat, drought

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THE YIELD-SLASHING COMBINATION OF HEAT AND DROUGHT is likely to intensify in Idaho’s wheat fields with today’s climate trends, says Jianli Chen, University of Idaho wheat breeder at the UI Aberdeen R&E Center. Calling decreasing water availability and rising temperatures “a great peril” to Idaho’s wheat industry—which generated some $512 million in cash receipts in 2009—she has made the identification and development of drought-tolerant winter and spring varieties a priority in her breeding program.

Combining old/new tools. By integrating newer biotechnology tools with classical breeding practices, Chen expects to accelerate release of improved varieties. In work with the Western USDA Genotyping Center at Washington State University, she has used molecular markers to evaluate 276 Pacific Northwest released varieties and historic lines for drought tolerance, among other traits. She also established a drip-irrigated drought-screening nursery, where she evaluated 30 spring wheats from Pacific Northwest breeding programs for five drought-related physiological traits. She is identifying molecular markers linked to these traits.

Ongoing/future studies include drought-nursery examinations of spring and winter wheats, on-farm testing of winter lines under no-till systems, and early evaluations of promising populations.

Chen anticipates that her efforts will “lead to the deployment of improved wheat varieties to help maintain the viability of Idaho and Pacific Northwest wheat on the global market.”

Barley profitability. UI Extension studies are also helping barley growers improve their profitability. Crop Management Specialist Juliet Windes found that planting the nation’s first industry-approved winter malt barley in 4-inch furrows provides enough protection from dry winter winds that—in a year with substantial winterkill—stands increased by 18% and yields nearly doubled. The variety, Charles, was released in 2005 by the USDA Agricultural Research Service at Aberdeen and the Idaho Agricultural Experiment Station. It was followed by Endeavor.

Windes says growers like malt barleys for their relatively high contract prices and winter barleys for their high yields and for earlier harvests that let them move water to sugar beets and potatoes. That makes combining both traits in one plant economically intriguing.

Tri-state potatoes make a big difference

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SINCE 1984, the Tri-State Potato Variety Development Program has released 34 varieties—23 russets and 11 chippers, red skins, long whites, and specialty potatoes. Jeff Stark, Idaho Tri-State coordinator, calls program impacts “substantial and increasing.”

Many products of this Idaho, Oregon, and Washington collaborative of land-grant universities, potato commissions, and the USDA Agricultural Research Service have been adopted by the region’s fresh market, french fry processing, and chipping industries. Ranger Russet, Premier Russet, Western Russet, Umatilla Russet, and Alturas are examples of releases that have greatly benefited Idaho’s potato industry, Stark says. Respectively, they were the state’s second, fourth, fifth, sixth, and eighth most widely grown cultivars in 2009.

Nationally, Ranger Russet, Umatilla Russet, Alturas, Premier Russet, and Western Russet were the third, fifth, seventh, 10th, and 11th most widely grown potatoes in 2008, with Tri-State varieties representing a fifth of the U.S. fall crop. Recently released cultivars are now produced on more than 140,000 acres in the Pacific Northwest, with an estimated value of $505 million to growers.
New computer program helps select herbicides


Developed by UI weed scientists Donn Thill, Joan Campbell, and Traci Rauch with funds from the Idaho Wheat and Barley commissions, it helps users slow herbicide resistance in weeds by rotating among chemicals with different modes of action.

A massive undertaking, the software includes all 120 herbicides registered for Pacific Northwest dryland crops. It combines two of CALS’ most popular publications into a dynamic program that can provide frequent updates.

Colleague Don Morishita of the UI Kimberly R&E Center is expanding the computer program into southern Idaho’s irrigated crops.

Weeds. CALS’ weed scientists are leaders in helping PNW growers limit herbicide resistance in weeds. More than 200 weeds worldwide now show resistance to commonly used herbicides.

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